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Science & Civilisation in China

JOSEPH NEEDHAM

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CAMBRIDGE UNIVERSITY PRESS

Arts and Sciences in China

Vol. 1. No. 1.

January/March, 1963

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Foreword

JOSEPH NEEDHAM, Sc.D., F.R.S.

Fellow and President of Caius College, Cambridge

Today, when Peking (the Cambaluc of mediaeval Cathay) and Ujjain (the Arim, world's centre, of mediaeval Arabic map-makers) are hardly more than eight hours' journey from Roman Londinium, the world has so contracted that greater mutual knowledge and understanding between the classical cultures of China, India and Europe, is not merely a pious desideratum but an urgently-felt need. Although they did not always know it before the labours of historians revealed it, the people of Britain, throughout the ages, were profoundly influenced by discoveries and inventions that emanated from the fertile brains and ingenious hands of the ancestors of the people of China. The foot-stirrup underlay the coming-in of feudal chivalry and feudal serfdom, the explosive force of gunpowder blew feudalism up; the magnetic compass and the stern-post rudder opened the gates of the Atlantic, printing and civil-service examinations led to the enlightenment and the maturing of capitalist society.

The most extraordinary thing about all these influences was perhaps that they left Chinese society, that bureaucratic feudalism, unchanged. China had sociological built-in feedback controls that kept her development slow and steady. Europe, more intrinsically unstable, suffered violent changes. One of these was that great scientific breakthrough which accompanied the upsurge of capitalism, the discovery of the basic methods of discovery itself; and this in due time was destined to transcend all the categories of the past, leading the whole world to a universal language, that of mathematics and modern science. Not only with the atomic age have all former social assumptions been outdated, but the vision of scientific socialism has arisen, the vision of the world co-operative commonwealth, alone capable of mastering the stellar forces which mankind has learned at last to release, and must learn to handle. This is the solvent which has reduced at last the age-old equilibrium of Chinese society, so that in our time the Chinese people have gone ahead, ahead of us perhaps, into the future of social rationality.

If then we are on the threshold of a world which will know no more of racial distinctions and narrow assumptions of superiority, or unjustifiable claims to the possession of absolute truth, a world when all men and women everywhere will be working side by side, no effort of mutual understanding can be too great. Just as the Chinese are learning of Egyptian archaeology or of the French revolution, so we must know all that we can of their painters and poets, their philosophers and inventors. It is the aim of ARTS AND SCIENCES IN CHINA to help meet this need.

A Science-Minded Nation

China's traditional scientific and technological heritage goes back to origins more than 2,000 years old; for many centuries, as Dr. Needham is showing in *SCIENCE AND CIVILISATION IN CHINA*, the Chinese contribution to the world was as remarkable in these fields as in the arts. A slow decline started at about the same time as modern science and technology was developing in Europe, and was accelerated by the impact of the West from 1840 onwards. Until the present generation, the overwhelming majority of Chinese children have grown up in a very backward technical environment, in which even such a simple machine as a bicycle was a rarity.

Since 1949, this situation has been transformed. A technically backward and largely agricultural people, between a fifth and a quarter of the world's population, is consciously taking the road, albeit a long and hard one, to becoming a modern industrial nation. The Chinese may well expect, as would befit their numbers, traditional skill, and industry, to become before the century is out the greatest industrial country in the world.

It is in this context that scientific and technological education in China today has to be considered. The traditional view of education as an avenue of escape from grinding physical toil was deep-rooted, and led even in recent times to 'returned students' from Europe or America being unable or unwilling to soil their hands with manual work. Hence the insistence, especially since 1957, on the need for close linking of theory and practice, teaching and research, mental and manual work. The phrase "Walking on Both Legs", so popular in China in recent years, is applied in many fields to drive home the point that the country must make use of every available resource for every task in hand. The writer has seen a small example of this near Chengtu, in the south-west, where an 18-year old peasant youth, of very limited education, was making badly needed chemical fertiliser from local raw materials by methods he had learned for himself from a school chemistry textbook. Hundreds of thousands of similar examples could be given. The results were not always wholly successful, but the educational value of demonstrating to millions of peasants that they could make things for themselves, and were not fated always to be backward farmers, was considerable.

In the regular educational system, elementary science lessons start at primary level and go on in the normal way through secondary school to college, at which stage there is a very wide range of specialised institutions and courses. In 1961 over a third of the 160,000 college graduates were engineers, almost a third teachers, and the great majority of the rest agriculturists (10,000), doctors (19,000), and natural scientists. In 1962 the total number of graduates was 170,000, of whom 59,000 were in engineering, 20,000 in agriculture and forestry, 17,000 in

medicine, and 11,000 in the natural sciences. Those completing courses in 1962 brought the total of all college graduates in China since 1949 to 900,000, of whom 290,000 were engineers.

This substantial output of trained personnel is part of what the Canadian economist-diplomat Dana Wilgress has described* as "a beautifully phased programme", under which China will by 1980 be turning out more new scientists and technologists every year than any other country. This programme is being conducted within the framework of a system of higher education completely reorganised ten years ago, and expanded to form a comprehensive system of universities, polytechnics, and specialised institutes.

As the recent Royal Society delegation observed, the rate of expansion has imposed a heavy burden on teachers, who are particularly needed in the middle grades, and this has limited the amount of research being done in universities. (Most research is done in the specialised institutes of the Academy of Sciences, together with the Academies of Medical Sciences and of Agriculture). But Chinese scientists are fully conscious of the necessity to maintain and improve existing teaching standards. The "productive labour" in which all students take part is so organised as not to take time which should be devoted to the student's acquisition of fundamental knowledge in his field and his training in fundamental techniques and research methods. And, in the institutions of higher learning, "teaching research groups" are often formed by organising teachers of each particular subject or those of related subjects, under the direction of a professor, to improve teaching work. The collective efforts of members of these groups have been instrumental, for instance, in helping to compile and improve programmes and syllabuses for many subjects.

Five-year courses are the rule in most subjects, with some of four and some of six years. Selection of students is by competitive examination on a national basis, and standards are exacting. At the end of their courses those who wish to do advanced study or research are subject to equally rigorous tests: in the autumn of 1962 some 800 were selected from 4,000 graduates, school teachers, technicians, and research assistants who applied.

In the whole country more than 100 million children and adults are engaged in full-time study (with 3 million full-time teachers) and many millions part-time (with 750,000 part-time teachers). Secondary education includes vocational and trade schools, and in the countryside the agricultural middle schools, whose students work in the busy months and study during the slack season on the farms. Enrolment in these schools is probably not included in the official figure of 9 million for secondary education. The spare-time school, at all levels from primary to college, has an important role in raising the general standard of scientific and technical knowledge and enabling able but under-educated people to improve their skills, sometimes to the extent of becoming outstanding workers in their fields. Peasants, technicians, and industrial

*"China's Forward Leap in Science", *Discovery*, November, 1960

workers can in this way become agronomists, designers, and engineers. It is indicative of the close integration of education with society as a whole that in Shanghai only 22 per cent. of almost 36,000 instructors in spare-time classes were (1959) professional teachers; in 1961 over a million Shanghai workers attended such classes.

The organisational link between professional and popular science, nationally and locally, is provided by the Association for Science and Technology, to which are affiliated China's forty or more scientific societies. Local organisations at provincial and county level maintain close contact with factories, communes, government organisations, and schools. Scientists and engineers, both professors and students, go from the cities to the countryside, to help the peasants deal with their agricultural problems. Public lectures, films, radio, television, and the printed word are all being used to spread knowledge of science and technology. Recent productions of the Shanghai Science and Educational Film Studio include a series illustrating good farming practice, combining traditional and modern scientific methods. Another Shanghai studio has made a coloured feature film showing the fight against the liver-fluke disease, schistosomiasis.

The great growth in literacy has been accompanied by an insatiable demand for newspapers, books, and magazines. Very large numbers of simple handbooks have been produced, especially for agriculture and light industry. At the other end of the scale are monographs such as the 700,000 word CULTIVATION OF PADDY-RICE IN CHINA. The Shanghai Association for Science and Technology publishes two popular science periodicals, one covering foreign and the other Chinese developments, as well as a more elementary journal for rural readers. A popular science series for secondary school students is being produced in 300 volumes.

A particularly noteworthy development is taking place in television, with college-level courses in mathematics, physics, and chemistry being broadcast from the stations at Peking, Shanghai, Harbin, Tientsin, and Canton, and supplemented by correspondence courses. In Peking, arrangements provide for the 35,000 students now taking such courses to receive in four years training comparable to that of regular college graduates. Preparatory classes are also being run for secondary school students.

The recent Royal Society visitors to China felt, in the words of Sir Lindor Brown, that "China has a long way to go in the scientific field, despite the progress of recent years. It seems that they are at about the same stage as the Soviet Union before World War Two". The Chinese are, indeed, the first to emphasize their backwardness. The combination of a great rational and empirical tradition, hunger for education, revolutionary enthusiasm, and progressive planning, is, however, a formidable one, which can hardly fail to produce remarkable results.

Tu Fu - Sage among Poets

1962 was the 1,250th anniversary of the birth of Tu Fu, China's greatest realist poet. He was born in Kunghsien in the province of Honan. Much of Tu Fu's boyhood was spent in the provincial centre of Loyang. At fifteen he was already well known for his writings.

Between 731 and 740, Tu Fu travelled in many parts of China, learnt much, but started no career. A few poems remain from this time. In the summer of 744, Tu Fu was inspired by his meeting in Loyang with that other incomparable poet, Li Po. Li Po was already famous and eleven years his senior; Tu Fu was just beginning to evolve his own individual style; but they became close friends.

In 746 Tu Fu went to Changan, the magnificent Tang capital. He tried to obtain an official post there, but was unsuccessful. By the time he was forty, he was living in poverty and his health was failing. As his biographer, Feng Chih, writes: "He passed through poverty-stricken lanes to the private parks of nobles, from the splendours of the River Bend to Hsienyang Bridge where the conscripts were marched off. His failure to become an official brought home to him the corruption of the court, his own poverty helped him to understand the people's sufferings."

In the second half of the century, Tang power declined sharply, warfare and corruption spread throughout the Kingdom, and there was continual fighting with the barbarian tribes on the frontiers. Dogged by poverty and illness, swept about by the changing fortunes of those who might protect him, Tu Fu found no peace. For some years he lived by selling medicinal herbs and begging.

Nevertheless, through all his years of torment, Tu Fu wrote prolifically. More than 1,400 of his poems are extant today. With profound feeling and a mastery of technique, he has handed down to us a faithful, comprehensive and penetrating picture of a people's hopes and sorrows, the magnificent and tragic life of his time.

Tu Fu died in the winter of 770 at the age of fifty-nine on board a boat in the upper reaches of the River Hsiang. Since his death his name has been cherished by the Chinese people. For centuries, monuments and temples have marked the places he visited, while the thatched hut he built in Chengtu has made that spot hallowed ground to lovers of Chinese literature. Tu Fu has been called the "sage among poets" and his work described as "history in poetry". Since the establishment of the People's Republic of China his greatness has been more widely recognised and his works more fully appreciated and studied. The poems of Tu Fu are one of the finest treasures of Chinese classical literature, and a valuable part of the literary heritage of the world.

CROSSING THE FRONTIER:

*It is sad, sad to leave my home and go
Far, so far away to the Chiao river.
The Government has set a limit of time,
And if I flee I am caught in a net of troubles.
Rich in lands is your Majesty's realm already;
How many more would you invade and seize?
I must renounce the love of father and mother
And hold my tongue and carry a lance and march.*

*The day that I left my home is long past;
I am used to the hard marches and the bullying.
A man must be ready to die at any time,
But how can the love of flesh and blood be stifled?
The bridle slips from the head of my galloping horse,
The silken reins are all that is left in my hand.
Lofty mountains pass me by like a flash,
As I bend low to try and pick up a flag.*

*As I was grinding my sword in the sobbing water,
I cut my hand, and the water was tinged with red.
Let that heart-breaking sound be not so loud,
For my thoughts have long been confused.
We are men who have sworn an oath to our country;
Are we to change our minds and have regrets?
We can hope to have our names in the Hall of Remembrance,
But our bones on the battlefield will soon be rotting.*

*When I was sent on a march, there was a guard;
Far at the frontier post, there is my body.
Living or dying, I must keep going forward
And give the officer no cause for anger.
On the road I met with a man I recognised;
I gave him a letter to take to my people at home.
Alas, alas! that we are forever apart
And never again to bear our hardships together!*

*A long, long way, a thousand miles and more,
They brought us here to join the Three Armies.
Your luck in the army may be good or bad,
Even the Commanding Officer cannot know everything.
Across the river we see some Tartar horsemen —
Suddenly we can count a hundred squadrons!
We are waiting now to be made into slaves;
When are we going to receive our decorations?*

*When you choose a bow, you must choose a strong one,
When you pick an arrow, pick one that's long,
When you're shooting a man, shoot at his horse first,
When you're capturing bandits, first capture their leader.
There must be a limit even to the killing of men;
Each country should keep to its own borders.
If only all invasions could be stopped,
Would there not be fewer deaths and wounding?*

*Whip up your horse, snow has begun to fall,
The marching army has reached the mountain heights.
On a perilous path we hug the cold rocks,
We stub our toes on the splintered ice.
The moonlight of China is far behind us now;
When shall we return from building the Wall?
The floating sunset clouds are travelling south;
We can look at them, but we cannot climb upon them.*

*The Khan advanced against our ramparts
In thirty miles of wind and dust and dark;
We struck five blows with our fierce swords.
And all the enemy hordes were put to flight;
Their famous prince made prisoner and sent,
Bound by the throat, back to the General's gate.
Quietly we close the ranks and march on;
One victory is not worth mentioning.*

*I joined the army ten years ago and more;
Can it be that I've not had the smallest success?
The common soldier has nothing to show for his service;
Some boast and lie but I will not compete with them.
Now even in the heart of the homeland there is fighting,
While the wars go on with the tribes of the north and west.
A man can expect to be sent to any frontier;
If I refuse to go will I remain unsatisfied?*

Editorial Note: Andrew Boyd, who died in March, 1962, was a devoted student of Chinese culture. He translated a selection of Mao Tse-tung's poems, published in 1958 in Peking, and was the author of a book on Chinese architecture which will be reviewed in our next issue.

A Musician's Journal

FREDERICK PAGE

Canton

On the journey to Canton, the train radio has a noisy jollity. I had feared the radio racket, the big brother stuff, the barking voice, but was never to experience it in China, except in a mild form accompanying physical jerks on stations at 6 a.m.; and this train radio was spicier than the radio on Newman's buses.

J. and I are whisked off from the Love the Masses Hotel somewhere, we know not where, to a concert, bang at 10 a.m. on our first morning. We find ourselves at the Conservatorium and are entertained. First item is a youth orchestra playing western style; this astonishes by its verve, fluency and attack; they play without music and the sound slides along, easy, relaxed, lyrical. They play a *Holiday Overture*, written by Shostakovich for a youth orchestra, a movement from Bizet's *L'Arlésienne*. Woodwind are noticeably pure and sweet, brass good, only the string tone sounds a little cheap. We wonder whether this is not a matter of locally made instruments.

There follows a small ensemble, eight to twelve players who play national instruments, the *pi'pa* (a lute), the *erh-hu* (the two-stringed fiddle), the *ch'in* (a dulcimer) with recorders, bells and cymbals. They play folk melodies, are obviously an expert group, and we learn later that they have travelled to Moscow to take part in folk-music festivals. The sound is enchanting, melodies come happily, my ears are pricked by the light sonorities and textures as they were in Paris listening to Boulez (I had better not tell them this). Nothing cloyes, nothing drags. One plays a solo on the *erh-hu*, a haunting poetical little piece with a title like, 'The bird returns to the forest at nightfall and sings'. It is as exquisite as Rameau's 'L'appel des oiseaux'.

That night we go through silent streets, dark but for little shops lit with lamps, through soft spicy southern air to the opera. The only motor-car is ours. A Vietnamese company is on its way home and is playing a fairy-tale opera about a peasant and his wife who, for their goodness, are rewarded with a magic pitcher. There are words, singing and dancing; the music is soft and gentle, nothing in the singing is forced or assertive. Colours possess a silken glow, a dancer turns her hand on her wrist and the effect is magical. I am teased with the notion of Mozart in Peking. These first impressions were never to be brushed away. Peking classical opera may be difficult but my remaining impression of the first music I heard in China is of its lyricism, its unaggressive sound.

Peking

On the eve of Liberation Day there is a grand banquet in the new Congress Hall; three orchestras play, a national instrumental, a western-style, a military band. The western-style orchestra plays Tchaikovsky waltzes ravishly. The day itself brings band music of great solemnity: balloons go up, peace doves fly, the drilled thousands wave their paper

flowers that spell out patterns, the red silk flags on Tien An Mien ripple in a faint stirring of air; everyone suddenly bursts out singing and waving flowers and imprinted on my eye is the red of those silk flags.

We ask to meet musicians, to go to the Conservatorium, to see collections of instruments, to hear as much music as possible. I am curious about harmony in the Han dynasty. Like Russians inventing the steam engine they discovered harmony before they should have. It is not fair. Eventually a time-table turns up; we are too late for *La Traviata* and we choose to go to the Ming Tombs rather than to an historical concert of Chinese music. Bad luck, but we can't fit everything in.

The Peking classical opera on its own ground must obviously be good, but the operas we saw are those with closely involved plots, the interpreter's running commentary becomes more and more baffling, and one realizes how hermetic and specialized these operas are. I would like to have seen again *Autumn River*, the girl and the river-man, *Where Three Cross-Roads Meet*, the fight in the dark, and recall how very good the Company was that came to New Zealand in 1956. I find I prefer the legendary tales, *The White Snake*, and in Shanghai, *The Three Looks*. Applause breaks out for an actor's delivery, as it once broke out for a shake and a turn by Farinelli. This is a reserved art form and seems to have been kept thus for centuries.

The Conservatorium is impressive: it is housed in a lovely old house and courtyard, and several utility buildings are going up. One wishes the Chinese would build better. There is the ceremony usual at all meetings with the Chinese, at commune, factory or conservatorium; cigarettes are offered, tea is drunk, we get the before Liberation story, the after Liberation record, then follows a tour and a request for 'criticism of our shortcomings'. Dutifully one jots down that the course is a five-year one, that there are in the senior department five hundred students, ninety-nine teachers, so many pianos, so many books in the library and so on. The range of studies comprises folk music, national instruments, national drama, musicology, composition, conducting, singing, and the various Western instruments. There are separate institutions for classical opera, for Western opera, for ballet. Composition students study rudiments, harmony, counterpoint, fugue, instrumentation, analysis. A part of the Conservatorium is an instrument work-shop, where students learn how to cope with their instruments, to make them, if need be. In the Shanghai Conservatorium instrumental students are expected to put in two hours weekly in the work-shop. This shows the commonsense approach of the Chinese. If there is a conservatorium in the West which carries out this work-shop idea, I've yet to hear of it.

A day or so later I meet composers and teachers at the Composers' Institute.

They asked me to give an account of music in New Zealand. I spoke of amateur choral societies, of brass bands, of music syllabuses in the universities, of the N.Z.B.S. Orchestra, of the chamber music organization, of the performances I'd been brought up on of the St. Matthew Passion in the Christchurch Cathedral, of the fact that as a piano student in Christchurch in my day one had a choice of teachers who had studied with Godowsky, Leschetizky, Petri, of the opera

company, of visits by the Czech Philharmonic and the Boston Symphony, by the Smetana and Janacek string quartets, by Oistrakh and Rostropovich, and finally of our composers.

I made it clear that I had read Chairman Mao's Yenan forum dissertation on the arts, written in 1942. I had bought a copy in the hotel and mugged it up at nights, dutifully at first, having nothing to read, and then with great interest. Its thesis is that music must start from the peasant, he being the fount of good, that the musician must not set himself apart, must know what labour is, what sweat is, and must encourage, lead and inspire the peasant with his song. The musician must in fact be Orpheus able to move mountains so that rivers may run. They are starting from the ground up. They asked me then to speak of 'our glorious heritage of national music' in New Zealand. This was awkward, and as the reader can imagine, hard to answer. I took my cue to speak on Vaughan Williams, of his academic training, his year in Berlin, his refusal to write German music, à la Elgar, his discovery of folk song, 'That's the music for me', of the twenty years it took him to forge a style, of the appearance of the *Pastoral Symphony* in his fiftieth year, of his book *National Music* and his argument that if you wanted to write music you must find out where your roots are. I said that in Prague last year musicians I had met were interested in this book, that I had later sent on a copy for possible translation. Perhaps one day it would be translated into Chinese? A ripple of amusement in one corner. 'Tell the professor that we translated this book four years ago.' Not for the first time has the foreigner, even though he comes from the far, far East, tried to tell the Chinese something they already knew!

We spoke of group compositions, as I had heard examples of such works. Apparently it is as simple as this: three or four composers in sympathy with each other come together, agree to write a cantata, or a tone-poem, or for example, the re-telling of a folk-legend, the establishment of a commune; if the latter, then a plan is drawn up, which could be coming together of peasants (bustling first movement), difficulties (scherzo in seven-eight time), the way ahead (cantabile slow movement), finale of general rejoicing, with thanks to Chairman Mao and the party (and perhaps a quote from Beethoven's Sixth). The composers agree to take on this or that movement, they show each other work from initial stages, suggestions are made 'in a friendly co-operative spirit', all have a go at the orchestration. It is tried out, revised, brought to performance. If the orchestra likes it, if it 'goes', then the work is taken up, and performed repeatedly. We can smile at the naiveté of such a scheme as I have outlined, but should we smile? The idea of group composition need not be so startling; one thinks of the Russian Five, of Vaughan Williams and Gustav Holst showing each other their works, of what Vaughan Williams owes to Gordon Jacob's orchestration of the symphonies, of Joachim's practical suggestions to Brahms in the writing of the violin concerto, of whether or no Peter Pears looks over Benjamin Britten's shoulder as Britten writes the songs.

The works I heard were none the worse for being written by several hands. Nor were they of much consequence. I could see the question coming up that I was dreading, and it came. Would I give them a frank criticism of their work? The question was easy to answer at factory,

commune, and housing estate, but who was I to come along with my European yard-stick and say 'this won't quite do'. They have a good phrase, 'Learning to walk on two legs'; they were modest about their music, they were making no claims, they hoped that one day their present work would lead to something of value. I was grateful for the pause the interpreter's words gave and decided to criticize as far as I was able the craft of their composition. I did not say that their music was to me as insufficient as that of Coleridge-Taylor, that it was written in a harmonic style as simple as that of Sinding's 'Rustle of Spring', but that its construction was over-simplified, and that the orchestration was plastered on from outside, and not very well plastered on at that. We spoke of twelve-note music, of which they would have none, as, presumably, 'the people' would reject it. I admitted the sterility of much of the new music written up for example in the Current Chronicle section of the *Musical Quarterly*, spoke up for Dallapiccola and of what he felt living as a composer in Italy while fascism closed in, of Luigi Nono, and the fact that his *Polish Diary* has been acclaimed in Warsaw, of the compassion that Berg expresses for humanity in *Wozzeck*. One said that Bartok began as a good composer and became more and more complicated as he went on; the reverse seems true to me. Was it not unscientific to know what is going on in nuclear physics and not to acknowledge the changing frontiers in music? Fortunately the Chinese like one to put cards on the table, to come clean, and with this discussion, which rambled on over a pleasant afternoon, I felt that I made contact.

I pointed out that in my country I was free to play new music, that I was locked on as a musical Bolshy, but that, if I lived in China, would I not be a right-wing formalist? This delighted them. They wished sincerely that our N.Z.B.S. Orchestra would visit them; the Dresden State Orchestra played the Ninth Symphony in Peking in 1959, with Chinese soloists and chorus, and with members of the Peking Symphony Orchestra sharing desks, thus giving truth to Beethoven's 'Embrace, ye millions'.

Shanghai

Peking is beautiful and withdrawn: it is one Chinese box after another. It is a series of shocks, and it is proportion and measure. Shanghai is splendid and ugly. The Conservatorium, the Symphony Orchestra also, has the reputation of being the best in China, and the spring festival where new works are brought forward resounds through China. At the Conservatorium there are seven hundred students at what they call university level, taking the five-year course. In addition there are close on six hundred students at a secondary music-school level, taking the seven-year course: children's departments, courses for workers, peasants and soldiers in the evenings. Altogether the Conservatorium looks after some three thousand students with a teaching staff of more than five hundred. The students have won international awards at Warsaw (the Chopin Festival), Geneva (the Enescu Prize), East Berlin (the Schumann Festival, 1959), Prague (the Smetana Competition), and travel widely to youth festivals in the communist countries. All students study national music for two years; this could of course be folk song or opera as much as the instruments themselves. Emphasis

is placed on the emotional content of a work rather than its technique, and I was deeply impressed with a senior student's poetic playing of Chopin's B flat minor sonata. The Chinese have a flair for Chopin. He is an O.K. composer in that his music has grown from Polish soil; his lyrical tuneful right hand poised above the harmonic background provided by the left hand is a way of making music for which they themselves have a liking. I was not so impressed when they came to any music involving what we call Western counterpoint. The playing of the last movement of a Schumann string quartet was for me flat and without perspective. I also suspect that teachers and students over-use gramophone recordings; but in fairness I must add that the string quartet group, composed of girl students whose average age was twenty-one, was the one that won a prize in the Schumann contest in East Germany. For their piano students the teachers undertake research work. For example on the playing of Chopin, studies are made of his music, his use of folk-song, his patriotism. All piano students study Bach. They are in touch with teachers in Warsaw and Moscow and their playing shows that tradition. In group string playing, the students play with an enthusiasm that demonstrates that a power and love for music has been released in them. A piano professor looks after eight students, each of whom gets two hours a week with him. I would say they are exemplary teachers, to judge from the fine relationship I observed between master and pupil.

The composition teachers were insistent that composition should come from their teaching. As with the Peking teachers they believed that harmony must not be taught for harmony's sake; teaching must be geared to the practice of composition, and in this way works will appear. In addition, such practice must be geared to what they call productive labour, to research, and students must know what Life with a capital L is about. For example, some music students were in the country where a new water irrigation scheme had been put through; they were so moved by the peasants' happiness that they wrote a cantata on this theme. And why not? This is a country which is familiar with famine, and knows what it means, and which now claims to have given the peasant an iron rice-bowl that will not break. The system is a mixture of manual labour, study and performance. The composition teachers said that they would be ashamed if their students could not compose; they would feel that they, the teachers were at fault. Great emphasis is laid on the character of tunes; life and ideals must be fused with technique.

The Shanghai Symphony Orchestra is good, though I myself did not think it up to the standard of our National Orchestra. They play a standard 'Proms' repertory, Mozart No. 40, Beethoven 1, 3, 5, with No. 6 in rehearsal; Dvorak *New World* and *Slavonic Dances*, Liszt *Les Préludes*, Tchaikovsky 4, 5, 6, Khachaturian No. 2, Shostakovich No. 11, Debussy's *Petite Suite*; they are in touch with conductors and composers in Poland, Finland, Rumania, East Germany, Japan, U.S.S.R. Their conductor has played in Moscow and Helsinki. They have a fine club house, with a new rehearsal hall, their own canteen, library, amusement facilities and so on. They take very seriously their responsibilities towards their own composers; they are happy for new works to come forward for a tryout. Members of the Orchestra take

up their own pens and themselves write suites, based on folk-songs, on revolutionary songs. The fact that some of these may not be much cop doesn't worry them in the least. 'How else shall we learn to walk on our own two legs?' The Orchestra takes its social responsibilities seriously; they play to workers to 'help them fulfil their targets', they help in the countryside, if called on at harvest, they do light work in factories in spare time, they rub shoulders with 'workers, peasants and soldiers'; in remoter places they take along singers and break up into small groups. They earn twice as much as steel workers.

Separately there is a National Instrumental Orchestra; in 1949 it could have been said 'the lute of cassia-wood is broken, who now plays the old melodies?' The old instruments had been put aside, the craftsmen forgotten, some musicians had taken to Western instruments. Now there has been over the decade an immense revival; the players feel that their work is just beginning. An orchestra of forty played for me various ensemble pieces, and solos, and finally a new work, 'Fishermen's Song of the East Sea'; this was composed by two young players in the orchestra, who lived and worked with fishermen for a while. The work is new in that it may be the only large-scale composition for an orchestra of such instruments. There were four movements, dawn at sea, the men set sail, storm, good harvest and return; a conventional pattern and a conventional work, except that the opening section was evocative of dawn, and the players themselves uttered shouts and cries at the height of the storm. As players they gave the work everything they had. I thought myself that national instruments with their individual tones were happier in an ensemble of eight to twelve than in an orchestra of forty to seventy, which seemed to be overpowering. But this was a vivid little work and, for once, in their modern composition I felt that the musical image was clear.

On Schönberg and Stravinsky musicians in Shanghai were informed, but that is all. The director of the Shanghai Conservatorium, a most likeable man, finally said to me, 'I have a flat, a piano, clothes don't interest me' (he had on the blue denim suit, the blue cloth cap) 'I don't have any anxiety over money: we in China will soon not be thinking of money at all; in a few day's time I will go into the countryside to draw inspiration from the people for a symphony I want to get going on, *The Long March*; I have the happiness of knowing that on my return my music will be wanted.' No words in China impressed me more.

A fascinating stage work to be seen in Shanghai is *The Spark*; this is a serious drama on a rebellion in a silk-mill run by imperialists in the evil days of the 1930's; a painful, yet moving play to sit through, particularly as many in the audience could remember those days, and it was relieved only by malicious take-offs of the Japanese owner, and of the gentlemen of the foreign press. At moments of tension in the drama the speaking voice would well up into song, so that in effect this was a new kind of opera. Traditional tunes are taken, to which new texts are set. There was no awkward step from speech to song. The song rose naturally from the action. The title is taken from a phrase of Chairman Mao's, 'A single spark can start a prairie fire'.

The Shanghai film studios have recently produced a film on the life of the composer of whom the Chinese are most proud, Nieh Erh. He was born in 1912, came to Shanghai, to the big city from the country,

about 1928, took up any sort of work, lived in poverty, somehow scraped money to buy himself a violin, was turned away from the Conservatorium—how could a peasant boy be a musician—threw in his lot with the party, and was sent by them, so impressed were they with his revolutionary songs, to study in Moscow. To get to Moscow, in 1936, from Shanghai, involved a journey via Japan; in Japan one day he went bathing in a river and either caught cramp, or was entangled by water-weed—it is not known—and was drowned. Nieh Erh had a gift for writing spirited melodies, and there is no knowing what training in Moscow might have done for him. The songs are published, recordings made, but one should remember that the accompaniments, the harmonic settings, have been added by later hands. One of the songs has been taken up as a national anthem, and Paul Robeson, a hero to the Chinese, sings Nieh Erh's '*Song of the Dockers*'. Nieh Erh had to teach himself how to write down his melodies. The main part in the film is wonderfully played by one of the finest film actors in China and though the film has weaknesses it is still deeply moving.

Besides Nieh Erh they revere one other composer, Hsien Hsing-hai, who studied with Paul Dukas in Paris in 1935. His main work is the *Yellow River Cantata* which is performed frequently. The European conductor of the Shanghai Symphony Orchestra in the late 1930's tore the manuscript in two, before the orchestra, when it was put in front of him. Hsien Hsing-hai died young in 1942 of T.B. It is a tragedy that these two men, who could have done so much for China, died so early.

Canton

The Chinese can still pull something out of the hat, even on one's last night. I went to a superb dance drama, '*The Magic Lamp*', given by the Peking New Experimental Dance Group. The Chinese with those eyes of theirs can create remarkable stage pictures with the economy of their paintings. One of these showed a steep rocky eminence a single fir tree, an old wise man with sparse white hair drawn into a top-knot, a handsome boy ready with sword to go into the world to fight the dragon. Again one thought of the radiance of *The Magic Flute*. It is true that the Chinese love dragons; a surge of excitement ran through the vast audience on his appearance. We almost cheered him.

I have said little of the ballet; nothing of the company trained on Russian lines that dances *Swan Lake* and *The Corsair*; nothing of the sword dance drama group, or of the excellent colour films, *The Long March* and *The Opium War*, all of which involve music and trained musicians.

I have had a glimpse of the richness of China's musical life. Except for the Peking classical opera, all that I heard is virtually the result of the work of the last eleven years. They are pouring out music at the moment, fully conscious of the directive that music must serve people. They are reviving old operas, creating new forms of opera, experimenting with dance groups, taking up choral singing with immense enthusiasm. I had reservations about the quality of some of their new national songs, but none about the vibrancy and urgency of their singing. They are cultivating their old instruments, creating new ensembles; factories are turning out concert grands; theatres, concert halls, opera houses are

packed. I was in China for one month and except for two days in Hangchow was only in big cities. I have no idea of what goes on in Chungking and Cheng-tu. What will happen when the music of the twentieth century west hits them? My final impression of their music today is that it is simple, lyrical, unaggressive. I never did discover much about Han harmony; and can only await a translation of a recently published treatise on it. There is much of musicological interest to be uncovered; many reprints (and, one hopes, translations) to be made of Sung and Ming texts.

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(Reprinted from "Land Fall", published by the Caxton Press, Christchurch, New Zealand.)

New Architecture and Tradition

One of the big jobs that has faced the Government of New China is building. Building of houses and flats, of factories, of hospitals, of theatres and other public buildings: the task stretches out before architects, engineers and building workers. Visitors to China comment on the immense amount of building that has been done, and it is immense. The Chinese are more concerned with the work before them.

It is therefore not surprising that at the Conference of the International Union of Architects in London there were present four distinguished architects and town planners from China. They were, Yang Ting-pao, Liu Yung-Hê, Lo Po-hua and Professor Wu Ching-jung.

They were most appreciative of the opportunities given by the Conference to make contact with architects from all over the world but also for the chance to look at British architecture, building and planning.

In discussion they said it was very difficult to sum up the position in China in a few words. Physical conditions varied enormously and there were in consequence considerable variations in practice. It could be said that the underlying thought was to combine as much as possible of past style and things distinctively Chinese with modern techniques. The size of the task before them was a heavily conditioning factor and therefore it was necessary to work on large scale projects and to carry them through very quickly while at the same time maintaining quality and building as economically as possible.

In illustration of what is being done, a large new hospital in Peking, was cited. The hospital was planned on the best modern lines but the treatment of the roof was traditional.

In building the Great Hall of the People the emphasis was on the use of the most up to date research on acoustics and building practice,

this was a monument of modern times. Even so, Chinese tradition had informed much of the design. The building itself paid a tribute to the past as well as basing itself firmly in the present.

In some public buildings it was more important to emphasise the past. The recently completed Peking Art Gallery, while still being obviously a modern building, perpetuated much more of the traditional style.

It was made clear that at present, and for some time to come, China would not be building skyscrapers. Most blocks of flats, for example, were 8 or 9 storeys. The highest in Peking was 12 storeys. Chinese architects were not even thinking in terms of thirty storey buildings.

As a broad generalization it could be said that construction was on the bases of reinforced concrete.

In a discussion on standardisation the Chinese delegation stressed that its full development required a basis of factories and communications that had yet to be established. None the less a great deal was being done with prefabrication, especially in housing, and in making pre-cast concrete columns and beams. There was a certain amount of site fabrication of blocks as well as factory fabrication.

The extent to which architectural developments in other countries was affecting Chinese architects was thought to be fairly small at present. This situation was changing daily; there could be no definite answer because the resources of China in machinery were small.

In architecture, as in so many other things, the problem was the shortage of trained men and women. It took from five to six years to train an architect and even then he would be only at the beginning of his life's work which would complete and develop his training. In 1952 there were between three and four thousand architects in training. In 1961 that figure had increased to six thousand.

There was also the problem of training draughtsmen and other technicians. This was no less important than training architects and was going on in all the main cities.

The method followed to ensure economy and efficiency in building was to separate the persons responsible for design and those responsible for construction. The Design Office not only prepared the designs but made detailed and tightly drawn estimates. These were then passed to the Construction Department and critically examined. A conference between the two groups ironed out any differences and the proposed building would be put to the financial authorities for authorization. It was emphasised that it was normal practice to make a bonus payment to the workmen if there was early completion of the building.

The architect delegates emphasised their view that every country had a traditional style which to some extent transcended modernity. This was no less true of China than of other countries. But its degree of truth would vary in different parts of any country. In China it would be true to say that today building in villages was essentially traditional. In towns modern needs were more insistent in requiring modern treatment. None the less sensible planning required attention to the past of a town as well as to its future. In Peking, for example, the Imperial City is being maintained in its old style.



Forming the west wing of Tienanmen Square, is the Hall of the National People's Congress. Built in 10 months, it is 336 metres wide, and has a roof decorated with yellow and green glazed tiles.

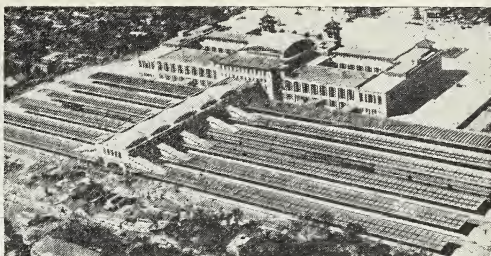
THE NEW PEKING



The new Historical Museum, on the east side of Tienanmen Square



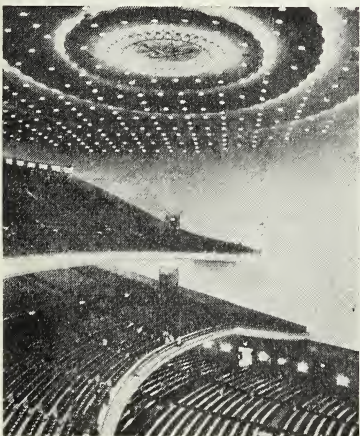
Nationalities Hotel, one of many hotels built in the capital since 1949, caters principally for foreign guests. Built by prefabricated methods, it has 13 storeys, 597 suites, and three restaurants, which serve Chinese, Muslim, and Western food.



Opened in the summer of 1959, Peking's railway station is the biggest in the country and can handle up to two million travellers a day. Its 17 waiting rooms include three specially for mothers with young children.

The Congress is composed of some 1,200 representatives, but the Hall's main auditorium holds more than 10,000 people, and is equipped with simultaneous translation facilities.

Part of the galleried banquet room, where official State receptions are held—it will seat 5,000. Congress Hall has a range of conference, reception, and dining rooms.



A New Chinese Renaissance?

DENIS and ANNA MATHEWS

Since we were accompanying an exhibition of British oil painting which had been sent to China, our first contact with the creative world there was with painters. (Encounters with writers and actors added depth to our idea of the Chinese artistic scene but in no way altered it, since any discussion on any of the arts centred always on the same statements.)

"We are here" said the charming Director of Hangchow Art Academy "to serve most of the people, the peasants, workers and soldiers, all the time."

A writer from Soochow, who would have been revolted by "Madame Bovary", remarked "The writer must take as his subject life around him, the man in the blast furnace, the girl in the umbrella factory. My last novel concerned a model worker in the umbrella factory—she is a very good worker and so has had a lot written about her".

All over China, hero-sized groups of workers, peasants and soldiers, strong and muscular, proclaim the sculptor's agreement.

As far back as 1942, Mao Tse-tung laid down once and for all the principles of art. The function of "revolutionary art and literature" is to "create all kinds of characters on the basis of actual life and help the masses push history forward". A recent Writers and Artists Conference in Peking repeated the words and phrases like a kind of magic formula which would ensure, in some mystic way, that a hundred (socialist) flowers would bloom and bear fruit.

Chien Chun-jui, the Vice-Minister of Culture, put it this way; "Literature and art is political and ideological work. Our duty it to assist the communist ideological consciousness and morality of the masses, speed up socialist construction and bring about the early achievement of communism. Those who would teach must first learn. Workers in the field of art and literature can shoulder this great and glorious task only by becoming thorough revolutionaries and one with the workers and peasants".

The New Patron

Towards this aim, artists were reminded that their living standard should not be widely divergent from those of the workers and peasants. In practice this is quite difficult to achieve as the creative worker is the privileged member of Society. The painters and actors to whom we spoke were well aware of the advantageous position they were in. Provided he accept the theory of communism, the Chinese artist is given a climate in which he can thrive. He enjoys patronage of a kind which is not dependant on whim or chance. There is a job for him to do and he will be paid according to his merits. (As a student, he spends 4-7 years at the appropriate Academy, which costs him no more than 30/- a month; this contribution for his food need not be paid if he is too poor).

On graduation, he shows his capacity to the Union, which enrolls him as a member and will find him work. If he is a painter he will get a teaching post, or be attached to a publishing house, and will receive a salary of from £17 to £40 a month, materials and travelling expenses free. He will get commissions for which he will receive from £15 up. An actor, apprenticed to a theatrical company will start as low as £4 a month, rising, if he is a star, to £1,500 a year or more. All these figures must be judged again by their buying power: rents, fixed by councils, account for as little as 3 to 5% of the total income; there is no income tax; prices for food and clothes are low.

Apart from this financial security, which many a Western artist might envy, the real advantage for the Chinese artist consists in his involvement in society. He is valued and respected, he is contributing life-blood, pumping excitement and strength through its arteries. It is he who conceives the anti-malaria posters, the anti-imperialist plays, the great national hero-figures: it is he who presents the people to the people. Because of this the artists recognise their responsibility to their public—"the broad masses of the people".

A leading actress doing her manual labour on a farm outside Peking was truly stimulated by mixing with the peasants, who themselves showed their adoration in return, as ordinary people here would when they meet a real "star". The past class system in China had separated artist from people, now he has a touching and humble approach to the folk around him and this is undoubtedly stimulating him to portray new themes, both in painting and literature. Too often, but quite understandably, this may mean that the conception is too naturalistic, that the raw material has not been recast into an artistic shape, and that the natural appearances have been overlaid with histrionic attitudes. In art discussions this would often be interpreted as Revolutionary Romanticism, but whatever the phrasing it looked like sentimentality to us. It was interesting in this respect to see the Chinese reaction to our own realist painters. For example Josef Herman's "Seated Miner"—which was a tired figure, though a tough one—was realism without the romanticism. He was not standing, smiling in the awareness of a glorious future. He was unglamorised, self-contained and about to smoke a pipe. Peasants and workers of today's Revolutionary Romanticism are perhaps as far from today's realism as the Arcadian shepherdesses in the idealised landscapes of the 17th century European painting.

Revolutionary Romanticism

In China, as everywhere else, a discussion on the arts is unintelligible without the key to the standard phrases. For the marxist, there is a formula which the politically conscious artist should adopt. This is to combine Revolutionary Realism with Revolutionary Romanticism. The function of any kind of art is to serve the masses. The aesthetic level of the masses is low (this point is put as gently as possible), so that serving them is a dual task: the artist must "elevate" public taste and at the same time he must "popularize" art. In practice, this means producing art which is understandable and not esoteric. The artist

must portray the lives of the masses and their socialist achievements, but as he must "push history forward", his task is also to encourage the masses with the conviction of their own greatness.

At the beginning of an art forum, we would walk around the room looking at the pictures. Oddly enough, the choice of what everyone considered to be the best would more or less coincide. But if we attempted to find out *why* we liked a certain picture, then a slight vertigo set in. We liked the same pictures for reasons utterly unrelated to theirs. It was comforting to find that our devious means should have produced so large a measure of agreement. Our discussion would run adrift when we were told of the innate taste and wisdom of the workers, peasants and soldiers, which seemed to us at odds with the privileged position of the expert in any field. An expert's duty is to mould opinion, to keep the general view running in the right direction. If, in the arts, this was not the case we were back once more to that yardstick of mediocrity—"I know nothing about painting/music/theatre but I know what I like". We pressed our argument with the example of a certain kind of Chinese New Year Poster, brash and gaudy, (there are, of course, many good ones) which sells to the broad masses by the millions: since a Chi Pai-shih reproduction sells only in thousands, does this mean that the New Year poster is better?

Fortunately, it transpires that the experts are there to guide. Belief in the artist's utilitarian value to society can carry with it inherent flaws, and for art to flourish it demands now, as it always did, that the expert, whatever his position may be, should be of discerning judgment or the masses of tomorrow will be disappointed.

What, then, did the experts consider a good picture?

It depends on what it represents. A picture can be divided into two parts, the content and the technique. The technique is important, but the content more so. Take the picture of a steel worker. If it is well painted, it is a good picture, because content and technique are harmoniously balanced. We learnt that not only must the content be right, but the ideology reflected in it must be right too. A picture in the British Art Exhibition by Frances Hodgkins, of some green peppers, came in for heavy censure. Fruit and Veg. are "good" subjects, but the Hodgkins peppers were "bad" art because, the critics claimed, they were represented as rotten—they could not be eaten! For a picture to be good, fruit must be healthy, the miner must smile.

As time wore on, an interesting anomaly became apparent. In spite of all the theories about workers, peasants, soldiers, politics, realism, revolutionary romanticism and so on, the most venerated figures in all the arts are those whose work is based upon tradition. Chi Pai-shih made his reputation painting beautiful flowers, birds and animals. Mei Lan-fang, China's most famous actor, won fame playing female roles in Classical Peking Opera. Mao Tse-tung himself wrote his revolutionary poems in classical Chinese—perhaps as intelligible to the average Chinese as Chaucer is to us. Every night of the week you can see Chinese theatre companies playing dramas a thousand years old. Every Exhibition Hall contains at least 50% traditional style water colours beside the modern oil-painting (a medium only 40 years old in China).

Tradition

New China is immensely and justly proud of its artistic heritage, and while it would be a simple matter to theorize about preserving past glories, a tenet of oriental art complicates the issue.

In the East, it has never been considered admirable to be different. Within the framework of Chinese water-colour painting there are many varied styles, yet you would compliment a mature painter by referring to his Master—something the western artist of today would find singularly irritating. So there is no rift, nor even a substantial difference between rivers and mountains painted in the Ming dynasty and rivers and mountains painted today. Since China's most venerated painters happen to be nature-painters, the regime must embrace them. "A picture of a peony", a friend tells us, "is a socialist picture. It reflects nature and socialist life, which is more colourful than any other."

"What", we enquire, "is the difference between a peony painted by a socialist and a peony painted by a reactionary?"

"The socialist painter paints with a freer spirit. A reactionary society never produces good artists."

For the sake of peace and understanding we let this pass.

Along with other theories, one that is bound to come up is "the wisdom of the masses". Everything produced by peasants and workers is automatically robust, free and excellent. Popular judgement is right judgement. The most admired picture is the good picture—though not of necessity the best, which may need the experts' guidance to make the broad masses aware of its qualities. Books with the largest circulations, the songs most often heard, the Wusih clay sculptures with the highest sales . . . these have become the standards of taste. We were disappointed to find these ubiquitous suburban standards. While the factory at Wusih were justifying the development of their craft on the strangely capitalist ring: "Well, they *sell*". Back in Peking we found the excellent 'folk-art' clay sculpture, designed by members of the Peking Art Academy and made by a housewives co-operative! A sense of values may be lost in one place but is being cared for in another. The problem of raising the cultural level of the vast population of the Chinese people cannot help but be difficult when there have been such enormous discrepancies in educational opportunity. On the whole, the official policy of giving culture to everyone is paying hands down.

Even more than the professional artist, it is the ordinary man who benefits from government policy. Anyone, unless he happens to belong to a very remote area, can take classes in painting, acting, handicrafts—whatever he likes. Sometimes he goes to the local Workers' Cultural Club (or Palace), often his factory organises classes for him. Theatres, films, concerts cost him about 9d. and the entrance to an exhibition is the mere token of a couple of pence. The classes and the auditoria are crowded. More than that: editors welcome contributions from amateurs—poems, short stories, even reviews, will be paid for and published. 'Sunday painters' have their pictures hung. Budding actors, musicians and dancers find an audience in the Cultural Palaces. There is a complete absence of mute inglorious Miltons (something of a relief after

the down-trodden geniuses of pub-time Chelsea). On his day off, the worker goes to the Ming Tombs (the restored ones—the Chinese are not interested in what is broken, *i.e.* morbid) or to the Loyang caves to see the rich cultural past his country has to offer.

Today, through the medium of the artist, China is binding the nation together, one heart and one voice. By using the artist, she is producing a phenomenon the like of which has not been seen in Europe since the 15th century, when the great religious painters, the poets and architects were united in expressing one vast and exciting theme to an audience which shared their elation and understood their message. It can be argued that this unity of voice between artist and the people fostered both minor talent and rare genius. It will be some years before Chinese artists can gauge how successful the present emphasis has been in bringing about their Renaissance.

What is Acupuncture?

DANA STOVICKOVA

The word 'acupuncture' comes from the Latin words *acus*-needle and *pungere*-pierce. It signifies the old method of Chinese needle treatment. The Chinese term *chen-chiu* is broader because it embodies two meanings. *Chen* means needle and *chiu* means moxibustion, *i.e.*, the burning of moxa (*artemisia vulgaris*). *Chen-chiu* signifies a special type of therapy by acupuncture or moxibustion. In both cases it means to stimulate the nerves at fixed places of the body (so-called sensitive spots) and by this means to stimulate or tone down the central nervous system. Stimulation can be attained either by inserting a needle to a certain depth between the joints, or muscle tissue, or by burning a specific amount of moxa.

Origin and History of Acupuncture and Moxibustion

There are only guesses as to the date of origin of acupuncture and moxibustion. The Chinese date its origin from the neolithic period. The first records are from the Han dynasty (207 B.C.-220 A.D.). The main development was during the T'ang dynasty (618-907) and the Sung dynasty (960-1273). The first bronze figure with marked spots was cast in the Sung dynasty; the first illustrated document on acupuncture is from the same period. During the last dynasty, the Ch'ing dynasty (1644-1911), acupuncture and moxibustion lost their continuity and were almost forgotten. The rational basis of this method was buried under a layer of superstitious instructions such as special rules for men and women, special applications during the day and at night, etc. Therefore, with the introduction of western medicine in China, it was condemned as a completely false and superstitious therapy.

Credit must be given to Dr. Ch'eng Tan-an and Dr. Tseng T'ien-chih for their new attitude towards acupuncture and moxibustion after the foundation of the Republic in 1912. Further development took place



The route of the large intestine (from the Sung period)

after the birth of the Chinese People's Republic in 1949. Today the Chinese are trying to get rid of some of the prejudices and superstitions about acupuncture and moxibustion and to find its effective technique. In Peking a Research Institute for Acupuncture and Moxibustion was opened. Students of European medicine are introduced to these therapeutic methods during their university studies. European-type hospitals include acupuncture and moxibustion in their physical therapy departments.

Acupuncture and moxibustion have not only been limited to China. While it was moxibustion that spread in East Asia, in Europe it was only acupuncture. Europe first heard about acupuncture from the book by a Dutch doctor of the East India Company, Wilhelm den Rhyne, *Amoenitatum Exoticarum*, in 1712. The first European doctor to use acupuncture in practice was Louis Berlioz. In France acupuncture became very fashionable and it was applied as a miraculous type of medicine for all ailments. After a period of great upsurge people began to lose confidence in it because of the lack of experience and later on it was completely forgotten. Soulie de Murand, a French Consul in China, revived it again. Thanks to his knowledge of Chinese he acquainted France with the technique of acupuncture in 1929. In France

today there are two societies for acupuncture and a special bulletin is devoted to it. Treatment is given in some hospitals and clinics.

In recent times acupuncture attracted the attention of Soviet doctors. In 1956 the U.S.S.R. sent several doctors to China to study and in 1959 they published in Moscow the translation of the handbook *New Acupuncture* by Dr. Chu Lien.

As yet acupuncture is a completely empirical field of medicine based on the centuries-old tradition and its effective methods have not yet been thoroughly investigated scientifically. The insertion can evoke either a direct reaction—by direct contact between the stimulator and the stimulated tissue—or an indirect reaction which appears at another spot, even far away from the stimulated spot. It is this second eventuality which is most important. Most likely, it is with the help of the nerve ends situated near the sensitive spots that the stimulation reaches the central nervous system and from there by reflex it affects the various organs or tissues.

Nerve Routes and Sensitive Spots

The terms we encounter most often in acupuncture are nerve routes (*ching-mai*) and sensitive spots (*ching-hsueh* or *tz'u-chi tien*). The nerve routes link the sensitive spots. There are now fourteen of them and their names derive from various parts of the body: the routes of the lungs, heart, pericardium, spleen, liver, kidneys, small intestine, large intestine, *san chiao* (respiratory, digestive, and secretory organs), stomach, gall bladder, urinary bladder, the route that runs down the centre of the head and back, the so-called *tu-mai*, and the route through the chest, the so-called *jen-mai*. In addition there are special effective spots, not on these routes.

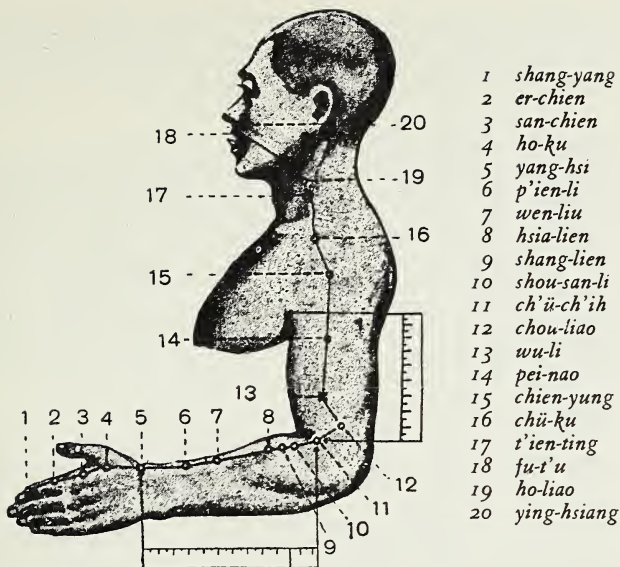
In old China they were of the opinion that there are two antagonistic forces in the human body: *yin* and *yang*, parallel to those in philosophy. *Yin* suggests calm, dampness, and materiality; *yang* suggests motion, dryness, and spirituality. These two forces attract each other. In old China they believed that if a person is healthy these two forces are in balance. If the balance is disturbed, *i.e.*, one of the forces suppresses the other, the person becomes ill. An excess of *yin* creates illness of the *yang* type, and vice versa. The nerve routes are divided in a similar way. The spots on the outer sides of the limbs are related to *yang*; the spots on the inner sides of the limbs are related to *yin*.

The routes are related to organs. *Yang*-type organs are those that derive energy from the outer world, for example, the stomach, small intestine, large intestine, gall bladder, and others.

Yin-type organs are responsible for conveying energy. They are the heart, lungs, liver, kidneys, spleen and the pericardium.

The routes of the large intestine, small intestine, stomach and other routes are related to the *yang* element; the routes of the lungs, heart, liver, etc., are related to the *yin* element.

According to the opinions of old Chinese doctors, *ch'i*, which we could translate as the life force, flows through these routes. *Ch'i* is what differentiates a live person from a dead one. If the circulation of



The route of the large intestine

ch'i is broken at any point, illness ensues; the sick organ suffers from either too much *ch'i* or too little. The objective treatment is *hsie-shih* (the release of excess *ch'i*), or *pu-hsü* (augmenting *ch'i* where lacking).

Today Chinese doctors are of the opinion that illnesses marked by violent reactions of the patients are illnesses of the *yang* type and call for toning down; illnesses of the *yin* type call for stimulation.

In acute cases, where it is presumed that the nervous system is stimulated, it is necessary to lessen the stimulation, and on the contrary, in chronic cases of weakened nerve functioning, it is necessary to produce stimulation. The first case is one of strong stimulation—*chung tz'u-chi* which replaced the old *hsie-shih* method. The second case of mild stimulation, *ch'ing tz'u-chi*, is practically the old *pu-hsü* method.

As clinical practice has shown, we have to say that these principles are not absolute and that it is necessary to continue more or less individually until further research brings detailed explanations of the scientific assumptions about the use of these methods.

The strength of stimulation depends on the thickness of the needle, the angle and speed of rotation. For strong stimulation strong needles are used at an angle of 180°-360°. The needle is inserted quickly and turned rapidly.

Strong stimulation is used mostly for strong people, men, young people or against acute illnesses.

For mild stimulation thin needles are used, the rotation angle is 90°, the needle is inserted into the muscle and turned slowly. They are used for weaker persons, women, older people and those with chronic diseases having acupuncture for the first time.

More About the Sensitive Spots

If we compare the number of spots given in the Han dynasty (160) and the number today (365) we see that it has doubled. The number of sensitive spots along the twelve routes on each side of the body (there is the same number on the left and right sides) is 312. The number of sensitive spots along the back and chest routes is 53, altogether 365 spots. It is possible that, with the further development of acupuncture, some of the spots will no longer be used since they are not very effective and the possibility that new ones will be discovered is not excluded. The names of the sensitive spots were taken from astronomy, geography, zoology, botany, architecture, anatomy, physiology, etc.

The sensitive spots are divided into three groups.

1. *A-shih-hsueh*. These spots have no names and are not fixed. They are determined individually. They are called the inconsistent spots. At first the Chinese thought they were the troubled places, but later found out that the spots could be far from the troubled areas. If we press them firmly with our finger, the pain in the troubled organ recedes. These spots are not included in the classical 365 spots.

2. *Ching-wai ch'i hsueh*. This name indicates that they lie off the fixed routes and they are not included in the 365 spots. Their position is definitely fixed. Because they are very effective they are called *ch'i hsueh*—miraculous spots.

3. The 365 classical spots. They lie along the 14 routes. It is necessary to say that the sensitive spots do not have absolute healing powers. It depends on the individual organism of every person. The determination of the basic healing powers of individual spots is the result of experience over thousands of years. Because this experience is often incomplete, it sometimes happens that the same sensitive spots do not always have the same effect for the same illness. There are no spots that have special never-failing results. During therapy several spots are usually used at the same time—one main one and the others which are called secondary. These combinations resemble the preparation of medicines in pharmaceuticals.

In old China they once formulated these rules for the combination of sensitive spots: if the illness is in the upper half of the body, insert the needle in the lower half of the body, if it is an illness of the right side, insert on the left side; if the illness is in the middle, insert the needle in the upper and lower parts of the body.

Today the following rules, essentially, prevail: combine spots near the source of illness with spots far away, which includes a valuable indirect reaction in addition to the direct reaction. For example, for headaches, combine the *t'ai-yang* spot in the head with the *ho-ku* spot in the hand. For normal illness combine one main spot and several secondary ones. Of course, sometimes, one spot is sufficient, but a

suitable combination of spots creates an even stronger effect. Beginners often think that the more secondary spots they use the stronger the effect will be. That is a gross mistake, because the excessive use of spots can lead to the collision of reflexes and thus to the lessening of the effect. Moreover, the patient will be considerably worn out.

In the case of a more complicated illness, for example, an extensive inflammation of the joints when the patient's whole body is in pain, even 20 needles would not be enough. In such a case the doctor chooses one or two of the most affected joints and then gradually gets to the others. Excessive needle piercing would bring the patient to an even worse condition; a weaker person might even suffer shock.

During chronic illnesses, when the treatment has to be given daily or every other day for a period of two or three months (even when the thinnest needles are used), it is understandable that the nerve or muscle tissue, which isn't capable of renovating itself so fast, becomes somewhat damaged. Therefore it is necessary to change the sensitive spots during the treatment. For every illness of this type there are a number of set main spots, which are connected with several secondary spots. They are used successively so that the insertion is repeated in the same spot once a week or once a fortnight, according to the time schedule of the insertions.

Determining and Measuring the Sensitive Spots

In old China they were of the opinion that sensitive spots are the size of a hole into which a bean or a finger would fit. Because the needles were inserted through the patient's clothes, the given spots were often different in old classical acupuncture textbooks. Today, even though the sensitive spots are anatomically and safely fixed, the locations



How to measure

are not absolute. While inserting the needle the doctor must feel the estimated place of insertion and press it with his fingers. If the patient feels a dull pain the doctor is on the right path. This feeling occurs in all sensitive spots except in those in the area of the stomach. People with a paralysed nervous system also do not react.

How is distance determined on the body? Although every spot is determined anatomically, modern acupuncture text books give the old Chinese measurements *ch'ih*, *ts'un* and *fen*. These measurements are not stable; every person has his own measurements. This means that a big person has a larger *ts'un* than a small person. (1 *ch'ih*=10 *ts'un*, 1 *ts'un*=10 *fen*.)

This method of measuring is called *ku-tu-fa* or *t'ung shen-ts'un*. There is one scale for limbs, another for the head and others for the chest. For the limbs one *ts'un* is the distance between the lines of the first and second joints of the middle finger when it is bent.

On the head the distance between the front and back hair line is 1 *ch'ih* and 2 *ts'un*, that is 12 *ts'un*. Where the hair lines are not apparent

we compute the distance between the middle of the root of the nose to the first vertebra of the spine as 18 *ts'un*.

Crosswise 1 *ts'un* is the distance from one corner of the eye to the other.

About the Needles

A long time ago smooth flint needles were used, later these were replaced by metal ones, later on by silver, gold and finally steel and stainless steel.

Nowadays three types of needles are in practice: *hao-chen*, *san ling-chen*, and *p'i-fu-chen*. The triangular needle *san ling-chen* is used in some cases to release blood.

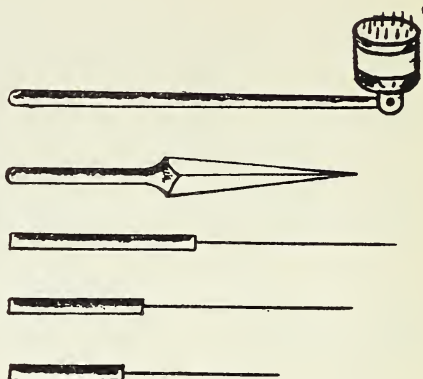
The skin needle *p'i-fu-chen* is sometimes called the children's needle; it is a small mallet with 6 or 7 small needles on an area of one square cm. It is mainly used on children for light tapping in the area of the sensitive spots.

Otherwise *hao-chen* needles are used for insertion. They consist of three parts: a handle with fine wire wound thickly round it so that it can be turned more easily, a neck, and the needle itself with its point. The needles are of different lengths and thicknesses, according to the desired insertion, depth and intensity of stimulation.

While inserting the needle it may have a 90 degree angle at the place of insertion (right insertion—used for most sensitive spots), 12-15 degree (reclining insertion—used for some sensitive spots on the head and chest, seldom used, the needle only penetrates the skin but doesn't reach the muscle), 45 degree (bevel angle insertion, used for all sensitive spots lower than the seventh chest vertebra).

The Process of Insertion

The patient must be put in the correct position. An incorrect position could lead to the wrong localization of spots and sometimes break the needle. Next it is necessary to sterilize the needle and the skin. The doctor finds the sensitive spot, uses his nail to indicate the area in which he can insert the needle and puts the point of the needle to the skin and inserts it about 1 mm. The needle goes deeper by turning and at the same time by being moved toward the proper depth. When the needle reaches the proper depth for a particular sensitive spot it usually begins to tingle.

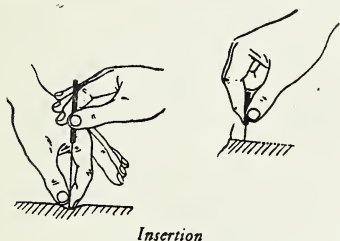


Common types of needles: 1. skin or percussive needle, 2. triangular needle for releasing blood, 3.-5. hao-chen needles

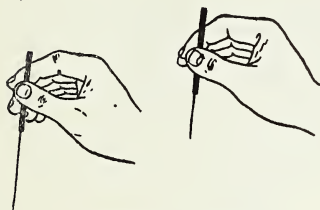
There are several methods of insertion: the simple, rotated, piston, combined, prolonged, interrupted, vibrated, and dispersed insertions. The most common insertion is the rotated insertion (*hsuan-jan-shu*) in which case the needle is turned with the thumb and index finger of the right hand, and pressed down at the same time. The speed and angle of rotation depend on the intensity of the desired stimulation. The piston insertion (*ch'ueh-cho-shu*): after the needle reaches the proper depth it is pulled up and pushed down successively. The prolonged insertion (*chih-chen-shu*): after insertion to the proper depth the needle is left in for about 5 to 10 minutes. There are cases when the needle remains in the body even up to two hours.

During acupuncture it is always necessary to expect accompanying difficulties, *i.e.*, the needle breaking or the possibility of shock, especially with people who have a weak nervous system and who have received too strong a stimulation.

The Forbidden Insertions



Insertion



Holding the needle



Inserting a long needle

Old Chinese medicine had a whole group of sensitive spots where the insertion of needles or the use of moxibustion were forbidden. Modern textbooks have different opinions as to the effect of these spots. Generally the following rule is valid: a needle can be inserted wherever there are no arteries, veins and important organs. With pregnant women care must be taken not to insert a needle into very effective sensitive spots, which could lead to miscarriage.

How Long Does Treatment Take?

For illnesses beginning with acute pain, such as headaches, toothaches, etc., 1 to 5 insertions are sufficient. For chronic ailments such as persistent rheumatism of the joints, repeated headaches over many years, etc., long-term cycles of treatment are necessary. One treatment lasts twelve days. During that time there may be daily insertions for the first six days, and insertions every other day during the next six days. After this treatment the patient must be left alone for one week, after which the next cycle can be started, usually every other day. In acute

cases where there is a change after the first six days there is no need to continue. With chronic illnesses, if there is no change for the better after two treatments it is proof that acupuncture will not help and there is no sense in continuing. If there is a visible change for the better the treatment can be repeated. It can go on for 2 to 3 months.

If the patient feels tingling after insertions there is hope of curing the illness, if there is only a dull pain or no reaction, whichever insertion method is used, the illness will be difficult to cure or it cannot be cured by acupuncture.

What can Acupuncture Cure?

Even though Chinese doctors today are aware of the great results of acupuncture they look at it soberly and definitely do not regard it as a miracle medicine that can cure all illnesses.

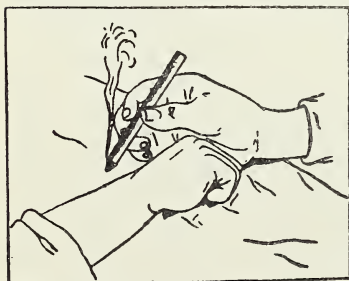
For some illnesses acupuncture is appropriate, for others it is not and does not help at all; in other cases it just lessens some of the symptoms.

Li Ch'ien-hsia in his book *Practical Therapy with Acupuncture* selected 96 illnesses for which the effects are most evident. As a matter of interest, here are a few of them: various types of paralysis and neuralgia, epilepsy, megrim, toothache, inflamed tonsils, asthma, enlargement of the stomach, excessive acidity of the stomach, stomach and intestinal catarrh, intestinal cramps, indigestion, diarrhoea, constipation, haemorrhoids, high blood pressure, inflammation of the bladder, inflammation of the urinary tract, gonorrhoea, bronchitis, rheumatic inflammation of the joints, endometritis, menstrual difficulties, influenza, mumps, inflammation of the tear duct, conjunctivitis, glaucoma, deafness, humming of the ears, rashes, excessive perspiration, etc.

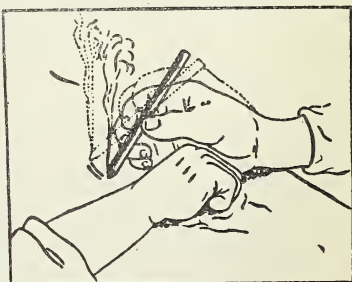
About Moxibustion

With this we have roughly gone through the first part of *chen-chiu*, or *chen-shu*, that is acupuncture in the narrow sense of the word. We still have to speak in brief about the second part, *chiu-shu*, that is moxibustion.

In both cases we use the same sensitive spots. While in China acupuncture now predominates, moxibustion is widely used in Korea and Japan. In Europe only acupuncture is known.



Moxa stick for moxibustion



Moxa stick in use

Very briefly, we can say that it is more appropriate to use moxibustion for chronic illnesses, where needles are not effective or for intensifying the effects of acupuncture.

Moxa, or *artemisia vulgaris*, is *ai* in Chinese. Most likely the word 'moxa' comes from the Japanese *mogusa* (burnt plant).

Only the moxa leaves are used. After being picked they are kept in a dry place for three years. After they are dried, they are ground and sifted so that we get a fine powder known as *ai-jung*. There are four types of moxibustion: direct, indirect, post-acupuncture and combined. In China, in the past, and in Korea and Japan today, direct moxibustion is used. The moxa stick—that is the moxa powder wrapped in fine paper in the form of a cigarette, is put on the skin and lit. Often the skin was burnt, blisters or even an inflammation with pus appeared. For example, in Korea today you can still see people with ugly scars which are the result of the method of therapy. To the extent that Chinese doctors use moxibustion (mainly for chronic illnesses and for old people where acupuncture isn't effective, or to increase the effect of acupuncture), they use the indirect method. They place an insulator between the moxa stick and the skin; a piece of garlic or ginger is best of all. This method doesn't leave any traces and the patient feels only a pleasant warmth.

The unit used for moxibustion is *chuang*. There are different interpretations of the word. Some interpret it as a unit which is to strengthen the human body; others say it is a unit which is necessary for a strong grown-up person. For old people, children and those who are not too ill it can be smaller. Practically it is the amount of moxa powder that will fit into a bean.

So much for the therapeutic method called acupuncture. There are still many unclear questions, but it is to be hoped that combined with western medicine it will be placed on a new scientific basis and in that way contribute to the enrichment of medicine generally.

(With acknowledgements to Dana Stovickova, a Czechoslovakian medical scientist, and to *Eastern Horizon*, in which the article first appeared.)

Comment by a British Doctor in China

As Dana Stovickova states in her article, acupuncture is an empirical field of medicine which has not yet been rigorously tested and evaluated by modern scientific methods.

Yet there is no doubt that when properly used on the right kind of patient, it can be strikingly effective. During my seven years of medical work in China, I have seen not a few examples of the clinical value of acupuncture—often in precisely that type of case where modern Western medicine is least successful.

In recent years, the Chinese Government has allocated very large resources of scientific personnel and equipment to the task of putting Chinese traditional medicine, including acupuncture, on a firm scientific basis. A number of lavishly equipped institutes staffed by eminent traditional and Western type doctors, by physiologists, pathologists, biochemists and scientific workers from allied fields, have been established.

The aim is to select what is best in both traditional and modern medicine and to fuse these valuable aspects of both disciplines together in such a way as to produce a new type of medicine superior to either of its predecessors.

This involves a rigorous testing and appraisal of traditional medicine by modern scientific methods, not only in order to be able to separate the wheat from the chaff, but also in order to be able further to develop that which is of value, either actually or potentially.

It would be a mistake to underestimate the difficulties in this undertaking or to expect quick results.

The very age of Chinese traditional medicine and the abundance of its written records, adds to its complexity. It differs from modern medicine not only in its techniques and terminology, but also in many of its basic concepts.

The Western doctor seeking to unravel the mysteries and learn the art of his traditional colleagues, must approach his task with both scientific detachment and with humility.

He will find the necessary humility easier to acquire if he bears in mind the great service which traditional doctors rendered the Chinese people throughout the long centuries when the mass of the people in the Western world were almost totally without medical care. During all this time, Chinese traditional doctors introduced huge numbers of herbal and other remedies, sometimes making important advances sometimes only appearing to do so and at other times, following blind alleys.

Some of these remedies, shipped out of Chinese ports by adventure-some sailors, or carried on the backs of mules or camels along the seemingly endless Silk Road, reached Western countries and were incorporated into Western pharmacopoeias as new and precious oriental cures.

Among such herbal remedies, the Chinese drug Ma Huang, under its Western name of Ephedrine, is still widely used in the West in the treatment of asthma—just as it was by Chinese traditional doctors more than 1,000 years ago. But I have seen acupuncture arrest an attack of asthma even more dramatically than an injection of Ephedrine—although its mode of action is as yet inexplicable by Western medical science.

Just as modern science has established the pharmacological action of the ancient Chinese drug Ephedrine, so it must now patiently undertake the far more difficult task of unravelling the complexities of acupuncture.

J. S. HORN, F.R.C.S., Eng.

Script Reform in China

A. C. BARNES

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Much has been heard of recent years about the reform of the Chinese script. The Chinese expression for "script reform"—*wentzu kaiko*—is often wrongly rendered into English as "reform of the written language", which may give rise to certain misconceptions about what is involved, so it must be made clear at the outset that it is not *linguistic* reforms that are being undertaken but *orthographical* reforms.

There is nothing new in this, for the present changes are only a further step in the evolution of the Chinese script, an evolution which can be traced back as far as the oracle-bone inscriptions of *circa* 1,500 B.C.

The Chinese script underwent a radical change about two thousand years ago, when the replacement of the stylus by the writing-brush made it necessary to replace curved lines with a squarer form of writing. The present changes, however, have been made necessary not by a change of writing media (leaving aside the problem of Chinese typewriting, a necessarily slow and laborious operation) but in the interests of universal literacy. That is to say, a simpler "spelling" is needed for the present attack on China's illiteracy problem.

The history of the Chinese script is similar to that of the ancient Egyptian hieroglyphics: an ideographic script developed into a partly ideographic, partly phonetic one; but whereas the Egyptian developed further and gave rise to the purely phonetic scripts of modern Europe, the Chinese script has remained for the past three thousand years in the intermediate stage except insofar as it is used to transcribe foreign names and words into Chinese—a procedure for which it is ill-suited since approximate equivalents have to be found not for letters but for whole syllables. For example, the name *William* becomes *Wei-lien* not because the Chinese would have any difficulty in pronouncing *Wi-liam* but because there are no syllabic characters pronounced *Wi* or *liam* and the closest approximation that can be found is a character pronounced *wei* and one pronounced *lien*. Foreign names and words often become quite unrecognisable in Chinese transcription: who would guess that *su-wei-ai* represents *soviet*, for instance?

Complexities.

The script is a very complex syllabary: each character represents one syllable of the spoken language but one and the same sound may be written in many different ways according to its meaning or derivation, often with alternative or non-standard "spellings". In addition to the printed form or forms of a character there will also exist a number of written forms—in fact, some characters are never written in the printed form.

For ordinary reading purposes a knowledge of perhaps four thousand characters is needed, plus a large number of written variants and abbreviations for reading handwritten material. In size the characters

range from one to over twenty strokes apiece. The characters themselves consist in general of two parts, one indicating the approximate pronunciation at the period when the character was first coined (some have been created during the present century) and the other indicating its past or present semantic category—for example, whether it is a fish, a plant, an emotion, an action performed with the hand, etc. These parts can sometimes be further analysed into smaller basic units and eventually into a limited number of types of stroke—horizontal, vertical, hook, dot, etc.

New Standards

The present reforms involve (a) a reduction of the number of strokes per character by simplifying either the elements or the character as a whole and (b) the abolition of several hundred “variant spellings”. Almost all the “new” standard forms are based on already existing hand-written abbreviations and on an average reduce the number of strokes per character by half, which represents an immense saving in the time and effort of learning and using the script. Yet even so the learning of the script remains a formidable undertaking, as may be well imagined.

A further difficulty is in its application to the rapid storage and retrieval of information. There is a traditional arrangement of the characters based on two hundred frequently recurring elements and the number of strokes, and others based on the types and order of the strokes, but they are far from being foolproof and involve much time spent in counting strokes and scanning likely locations. The simplification of the script, by removing some of the traditional “radicals” by which characters were arranged, has made a fixed order for the arrangement of characters even more difficult to achieve. It is perhaps on account of these difficulties that Chinese books are not usually provided with indexes. In an age when the massive documentation of scientific and technical writings is essential the significance of this lack of “index-mindedness” of the Chinese will be readily appreciated.

It may be asked: Why not abandon this cumbersome and inefficient script altogether and replace it with an alphabetic script which is easily learned and ideal for the rapid and reliable storage and retrieval of information?

Unfortunately this solution would do more harm than good at the present time. The main reason for this is that the same *written* language (the so-called “Mandarin” language spoken by seventy per cent of the population) is used throughout China even though there are five main *spoken* languages (popularly referred to as “dialects”) in use: between the mouth of the Yangtze and Canton four languages are spoken, namely Wu, Min, Hakka and Cantonese, each subdivided into dialects, and the language of most of the rest of China, though basically the same, also represents great dialect variations. When a Cantonese, for example, reads a newspaper or writes a letter it is not in Cantonese but in “Standard Chinese” (actually not very standardised yet), a language of which he would understand as little if he heard it spoken as a German would Dutch. In other words, when a non-Mandarin speaker learns to read and write he learns to read and write in a different, though related, language, not in his own. It is possible to write Cantonese, Min, Hakka

or Wu using the normal Chinese script with certain additions but this is very rarely done. A Cantonese can read a Peking or Shanghai newspaper aloud to another Cantonese, giving each character its Cantonese "reading" (whether the word exists in Cantonese or not) and on the whole it will be understood. So the traditional script is a valuable medium of *written* communication in China and to abolish it and replace it with an alphabetic representation of "Standard Chinese" would make the Shanghai and Peking newspapers quite unintelligible to the Cantonese reader. The same goes, of course, for all books, letters, telegrams, official notices and so on. Through the script China has a linguistic unity on paper which would be quite destroyed by the abolition of the traditional script. For this reason alone it will have to be retained at least until such time as *spoken* "Standard Chinese" is generally understood throughout China, which will not be for a long time despite the great progress already being made in that direction in schools and evening classes and by radio.

Translation Problems

Another reason is that the replacement of the traditional script by an alphabet would necessitate the transcription of a vast body of existing books and the translation into modern Chinese of the literature of the past three thousand years up to the First World War. Although written in ancient Chinese these latter books are not too difficult of access in their original form via the traditional script, which is common to both ancient and modern Chinese, but would become largely incomprehensible if merely transcribed syllable by syllable into a phonetic script. The objection that a vast amount of transcription would be involved has been advanced as an argument against English spelling reform and it applies with far greater force to China, where a certain amount of translation or annotation would be involved in addition. Eventually, without a doubt, Chinese will have an alphabet, but for the time being all that can be done is to simplify the existing script as far as possible by further reductions in the number and complexity of the existing characters.

The New Alphabet

Mention should be made here of the new draft alphabet for Chinese, whose promulgation recently has given rise to some misunderstanding abroad. Its purpose is not to replace the existing script but to be used in conjunction with it to indicate the pronunciation of the characters as an aid to teaching them both to children and adults, and to this end at least one newspaper and also a number of books are being printed with interlinear transcription into the new alphabet. Other applications are for helping non-Mandarin speakers and foreigners to learn Standard Chinese and for classifying and indexing information alphabetically: dictionaries, library catalogues, hospital records, etc. In some respects this alphabet, which uses the twenty-six letters of the Roman alphabet, is unnecessarily complex and inconsistent in its spellings but it is probably adequate to its present limited purposes. When eventually an alphabet is adopted for the normal writing of Chinese it will probably look very much like the present draft alphabet.

The problem of the reform of the Chinese script is a unique one in the world: here we have a great country representing a quarter of the world's population tied to a cumbersome and antiquated script for many years to come, however desirable it may be to replace it by a more efficient and easily-learned one, for while being a barrier to literacy and education it is at the same time (as Latin was to medieval Europe) the only practicable present means of written communication between a number of language groups.

Intending students of the Chinese language sometimes ask whether it is worth learning the traditional script "as it's going to be abolished and replaced with an alphabet anyway." The answer is an unqualified "yes". The introduction of a new script may be as much as a generation away and even then there will be a vast amount of untranscribed material to read, both ancient and modern. And even when the traditional script has been replaced it will still be taught at least in secondary schools, just as Latin is still taught here, for China prizes her unequalled literary heritage far too highly to allow it to be lost by a change of script.

Science Notes

Chinese scientists seem "fantastically well acquainted" with Western scientific literature, in the view of Sir Lindor Brown, vice-president of the Royal Society and leader of the Society's five-man delegation which recently returned last year's visit to Britain by members of the *Academia Sinica*, (Chinese Academy of Sciences). All the delegates were "greatly impressed" by the efforts China is making to overcome difficulties in scientific research. Sir Lindor said he did not wish to give the impression that "anything world-shattering" was being done at the moment, but "there was a lot of good work that anyone in Europe would be glad to have in his laboratory."

In these notes our aim will be to report regularly, in brief, interesting current developments in Chinese science.

PROFESSOR WILDER PENFIELD, a Canadian neuro-surgical specialist, has reported that the standard of medical work is extremely good. He particularly remarked on the heart surgery now being performed (with Chinese-made instruments) "as well as could have been done anywhere in the world". A workshop attached to the Shanghai Chest Hospital is making more than 1,000 plastic blood vessels (vascular prostheses) a year, of different types and sizes, for use throughout China.

On the 57th Anniversary of the FUTAN UNIVERSITY in Shanghai, almost 200 papers were read at a symposium held in celebration. The President, Chen Wang-tao, contributed a study of the Chinese language

since the last years of the 19th century, in which he took exception to the arbitrary forcing of grammatical rules from other languages on to Chinese, in disregard of its own special characteristics. Three generations of mathematicians took part in the symposium, the oldest being represented by Su Pu-ching, with a paper entitled *Contributions to the Theory of Conjugate Nets in Projective Hyperspace*, the fifth in a series he has written. The second generation was represented by his pupils, Professors Ku Chao-hao and Hsia Tao-hsing, who contributed *A Set of Boundary Problems of Systems of Quasi-Linear Equations of Hyperbolic Type and its Applications to Aerodynamics, and Non-Normal Operators*. The youngest generation presented over a dozen papers based on their recent researches.

At the annual meeting of the 38-year-old CHINESE METEOROLOGICAL SOCIETY 350 papers were presented. Among subjects discussed were the beginnings of research into types of circulation in the stratosphere, and the movement of the Pacific tropical anticyclone—the latter having a direct bearing on drought and flood conditions in China.

Cybernetics, flight mechanics and gyroscopic dynamics were discussed by eighty scientists at a recent PHYSICS SYMPOSIUM in Peking. Topics covered included the theory of stability of dynamic systems, acceleration of certain natural satellites, stability of aircraft in flight, time-lag systems and free-spinning tops.

The ninth convention of the CHINESE PALAEOLOGICAL SOCIETY, recently held in Peking, was attended by two hundred scientists and heard 133 papers. Considerable advances were reported in the study of morphological states of certain vertebrates and plants, the relations between tetracorolla and hexacorolla, and the evolution of graptolithoidea. Palaeontological research has begun in Inner Mongolia, the Tsinling Range, and coastal areas of Kiangsu Province. Compilation of the palaeontological series was begun in 1960 under the auspices of the Institute of Palaeontological Geology; the collection of fourteen separate works on different fossils is now nearing completion. Those on graptolite, atactotoechus (polyzoa) and stromatopora have appeared; those on mesozoic flora, fusulina, coral, gastropoda and ostracoda will appear soon. Manuscripts on brachiopoda, trilobitae and cenozoic flora are ready; those on lamellibranchiata and palaeozoic flora should be completed in 1963. The whole collection includes digests in Chinese of the thousand and more papers published in seven languages in the past century, with addenda and comments drawing on the latest findings.

The CHINESE FOUNDRY SOCIETY recently held its first meeting, in Shanghai, discussing principally: high temperature cupolas, alloy casting, and techniques of casting and moulding materials.

RECENT SCIENTIFIC PUBLICATIONS include a Chinese *materia medica* in four volumes, and annotated editions of many classical works, the earliest of which are over 2,000 years old, on agriculture, horticulture, veterinary science, and tree cultivation and grafting.

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